(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 860 626 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.11.2007 Bulletin 2007/48

(51) Int Cl.:
G08B 17/06 *(2006.01)*

(21) Application number: **07108689.6**

(22) Date of filing: **22.05.2007**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **24.05.2006 IT LC20060004**

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(54) **Fire prevention and protection system for rooms in general**

(57) A fire prevention and protection system for rooms in general is described. The system comprises, for one or more areas monitored by the system itself, one or more temperature sensors (10), positioned inside the room to be monitored, capable of detecting when a certain temperature value considered critical for the occurrence a fire has been reached, a control station (12), connected to the temperature sensors (10), capable of receiving the signals of the temperature thresholds detected by the sensors (10) themselves, and one or more indication and/or intervention peripheral devices for the protection of the room monitored, automatically activated by the control station (12) when the critical temperature value is reached to intervene in order to signal an imminent fire and to adopt the suitable countermeasures.

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Description

[0001] The present invention refers to a fire prevention and protection system for rooms in general, operating through area-specific temperature checking.

[0002] In fire protection systems the automatic detection of fires themselves has become increasingly important, since it allows an immediate intervention with the advantage of starting to fight the fire at its outset, i.e. when the damages are small and the fire can easily be contained with a quick response.

[0003] Currently, a widely used detection technique is based upon the use of optical smoke detectors, which use the physical effect of the reduction of light intensity of a light source when its beam is hit by the smoke generated by a fire.

[0004] A further known detection technique, on the other hand, is based upon the use of optical flame detectors, which are able to pick up the electromagnetic radiation emitted by flames to signal a fire risk situation.

[0005] Known protection systems are therefore able to be activated only when the combustion process has already begun, not therefore being able to avoid the occurrence of damages, even if they are small, to the rooms in which such systems operate.

[0006] Therefore, a purpose of the present invention is to solve the problems of the prior art, providing a fire prevention and protection system, through area-specific temperature checking, capable of activating itself immediately as soon as the conditions that can cause a fire arise, in other words even before the fire can develop, thus providing an early warning of the danger and automatically starting the signals and procedures according to the fire-prevention plan.

[0007] Another purpose of the present invention is also to provide a fire prevention and protection system that is reliable, cost-effective, easy to make and able to be applied to any type of room, as well as to the most varied fire-prevention problems.

[0008] These and other purposes according to the present invention are accomplished by making a fire prevention and protection system, through area-specific temperature checking, as outlined in claim 1.

[0009] Further characteristics of the fire prevention and protection system are object of the dependent claims.

[0010] The characteristics and advantages of a fire prevention and protection system, through area-specific temperature checking, according to the present invention shall become clearer from the following description, given as a non-limiting example, referring to the attached schematic drawings, in which:

figure 1 schematically illustrates the devices that, according to a particularly preferred example embodiment, make up the fire prevention and protection system according to the present invention, and

figure 2 schematically illustrates an other example embodiment of the fire prevention and protection system according to the present invention.

[0011] With reference in particular to figure 1, an example embodiment of a fire prevention and protection system according to the present invention is shown, which can be applied in particular to a kitchen in a home or in a commercial enterprise.

[0012] The system foresees, for each of the areas monitored, the presence of one or more temperature sensors 10, like for example thermostats, integrated in optical sensors or in known smoke detectors (not shown) for detecting a fire or else used as an alternative to them. The thermostats 10, suitably positioned inside the room to be monitored, in other words in the areas where the fire risk is greatest, are able to detect when a certain temperature value considered critical for the occurrence a fire has been reached.

[0013] The thermostats 10 are connected to a control station 12, more or less sophisticated, capable of receiving the signals of the temperature thresholds from the thermostats 10 themselves. If the preset critical temperature value is reached, the control station 12 is able to automatically activate one or more indication and/or intervention peripheral devices for the protection of the monitored room, like for example electrovalves 14, relays 16, electrical master or area switches 18, optical and acoustic indicators 20, alarm systems with telephone call 22, subdivision systems, extinguishing systems, etc.

[0014] If there is more than one thermostat 10, they must be electrically connected, in series or in parallel, so that the intervention, even of just one of them, creates an input signal to the control station 12 that, in turn, shall automatically actuate a certain series peripheral devices that shall intervene for that specific area in order to signal an imminent fire and to obtain the suitable countermeasures.

[0015] In addition, each thermostat 10, once the preset critical temperature has been reached, can activate one or more acoustic and/or optical indicators 20 directly connected to the thermostats 10 themselves, capable of warning the users so that they can intervene manually on the causes that can lead to a fire breaking out.

[0016] The fire prevention and protection system according to the present invention can satisfy the most varying needs, from lapses in concentration while cooking food and heating up drinks, from fire prevention in haylofts to constant checking of the maximum admissible temperature in a boiler room or in an electrical substation. It can constitute a valid fire signalling, prevention and protection system in all situations in which there is a fire risk and it can be applied to homes, public buildings, industrial locations, train stations, galleries, airports, woods, boats, vehicles, campers and others.

[0017] All of the areas monitored, be they a home, an industrial building or whatever else, shall be connected to the control station 12 capable of automatically actuating suitable preventative and protective measures. The

specific input-output functions of the system and of each area identified must be made after a considered step of study of the fire load.

[0018] The system in object allows preventative, quick and targeted interventions in the protected area, for example through inhibition of the supply of fuel, interruption of the current with immediate or timed interventions on the switches of the area itself or else on remote switches, or with other specific procedures, studied case-by-case with reference to the fire risk, to the characteristics of the rooms and to the levels of control and protection that one wishes to obtain.

[0019] The system can be integrated into the existing electrical installation or it can be equipped with an autonomous power supply, and the signals from and to the control station 12 can be sent by means of cable systems or wirelessly.

[0020] The thermostats 10 can be integrated into methane gas detectors, be located inside the ventilating hood of a kitchen, or else in the rosettes that hide the electrical connections of the light fixtures or in their immediate vicinity, always close to the ceiling, in a ceiling light fixture or in any other light fitting, in all rooms and/or areas subject to fire risk.

[0021] The optimal threshold for the intervention temperature of the thermostats 10 must be set for every device installed, according to its location and the type of environment in which it operates.

[0022] With reference to the example shown in figure 1, it should be stated that the increase in temperature in the cooking area of a kitchen is a frequent occurrence, often due to the carelessness of the users and their momentary absence, going away and remaining absent for a time longer than what is safe. The cooker, in these cases, continues to supply heat that, in the absence of liquids, is accumulated by the material that makes up the pan. Therefore, there is a disproportionate increase in temperature in that specific area, which can even lead to parts of the container melting, but before that setting on fire the furniture surrounding the ventilating hood and, without intervention, the fire spreading to the adjacent rooms.

[0023] The kitchen, which can be that of a home, of a camper or of a boat, can for example be equipped with two thermostats 10 connected to the control station 12. One of the two thermostats shall be positioned inside the ventilating hood arranged above the cooking surface and regulated with an intervention temperature from 80°C to 100°C. The other thermostat, positioned close to the ceiling, shall be regulated with an intervention temperature from 50°C to 60°C.

[0024] In the case of an anomalous temperature increase or a fire breaking out on the cooking surface, the thermostat 10 positioned on the ventilating hood intervenes acting upon the control station 12 which, automatically, blocks the supply of fuel, activates an optical and acoustic signalling system and, with immediate or delayed effect, interrupts the electrical current, acting upon switches of the area or upon the master switch.

[0025] In the case in which the anomalous increase in temperature occurs in the kitchen but is not generated by the cooker, then the thermostat 10 arranged on the ceiling would intervene, in the same way and with the same end results.

[0026] The system is also useful in the case of fires that occur in rooms close to those monitored, thanks to the phenomenon of heat conduction. The two thermostats 10 are regulated differently, so as to take into account the maximum admissible temperatures in that given area.

[0027] Figure 2 shows an example of application of the fire prevention and protection system to a hayloft or to other storage spaces where there is a danger or probability of catching fire.

[0028] In these cases, it is possible to constantly check both the temperatures of the endothermal processes, with detectors arranged inside the stored materials that are a fire risk, and the anomalies of the temperature of the storage room, with a suitable dislocation of the temperature sensors 10.

[0029] The switches T_1, ... , T_n of the thermostats 10 used as detectors, which in this case are electrically connected in parallel, ensure that the intervention even of a single thermostat 10 actuates the acoustic and/or optical signalling system 20. The temperature anomalies, quickly signalled by simple optical and acoustic signals like in the case described, make it possible to avoid irreparable damage to the stored materials and to the structures with a considered human intervention.

[0030] In a road tunnel or in a subway line, suitably monitored by thermostatic sensors 10, a few seconds after a fire has broken out inside them, due to the increase in temperature, the detectors signal the event and all of the procedures according to the specific fire-prevention plan are automatically started.

[0031] It has thus been seen that the fire prevention and protection system, through area-specific temperature checking, according to the present invention achieves the purposes outlined previously.

[0032] The fire prevention and protection system through area-specific temperature checking of the present invention thus conceived can in any case undergo numerous modifications and variants, all covered by the same inventive concept; moreover, all of the details can be replaced by technically equivalent elements. In practice, the materials used, as well as the shapes and sizes, can be whatever according to the technical requirements.

[0033] The scope of protection of the invention is therefore defined by the attached claims.

Claims

1. Fire prevention and protection system for rooms in general, said system comprising, for one or more

areas monitored by the system itself:

- one or more temperature sensors (10), positioned inside said room, capable of detecting when a certain temperature value considered critical for the occurrence a fire has been reached;
- a control station (12), connected to said one or more temperature sensors (10), capable of receiving the signals of the temperature thresholds detected by said sensors (10); and
- one or more indication and/or intervention peripheral devices for the protection of the monitored room, automatically activated by said control station (12) when the critical temperature value is reached.

2. System according to claim 1, **characterised in that** said one or more indication and/or intervention peripheral devices are selected from the group consisting of:

- electrovalves (14),
- relays (16),
- electrical master or area switches (18),
- optical indicators (20),
- acoustic indicators (20),
- alarm systems with telephone call (22),
- subdivision systems,
- extinguishing systems.

3. System according to claim 1, also comprising one or more acoustic and/or optical indicators (20) directly connected to each of said one or more temperature sensors (10) .

4. System according to claim 1, **characterised in that** there are more than on of said temperature sensors (10) and they are electrically connected, in series or in parallel, so that the intervention even of just one of them creates an input signal to said control station (12).

5. System according to any one of the previous claims, **characterised in that** said one or more temperature sensors (10) are thermostats.

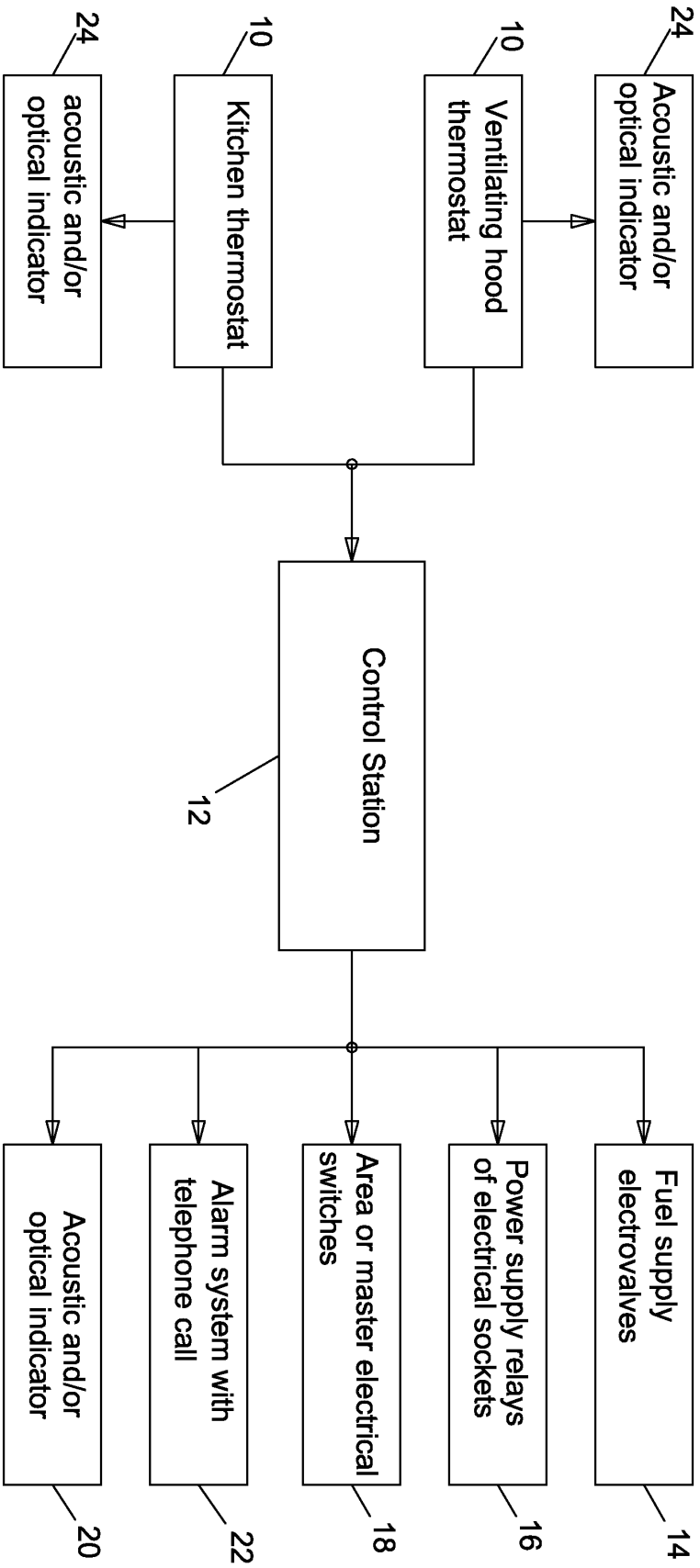
24
Acoustic and/or optical indicator
10
Ventilating hood thermostat
10
Kitchen thermostat
24
acoustic and/or optical indicator
Control Station
12
Fuel supply electrovalves
14
Power supply relays of electrical sockets
16
Area or master electrical switches
18
Alarm system with telephone call
22
Acoustic and/or optical indicator
20

Fig. 1

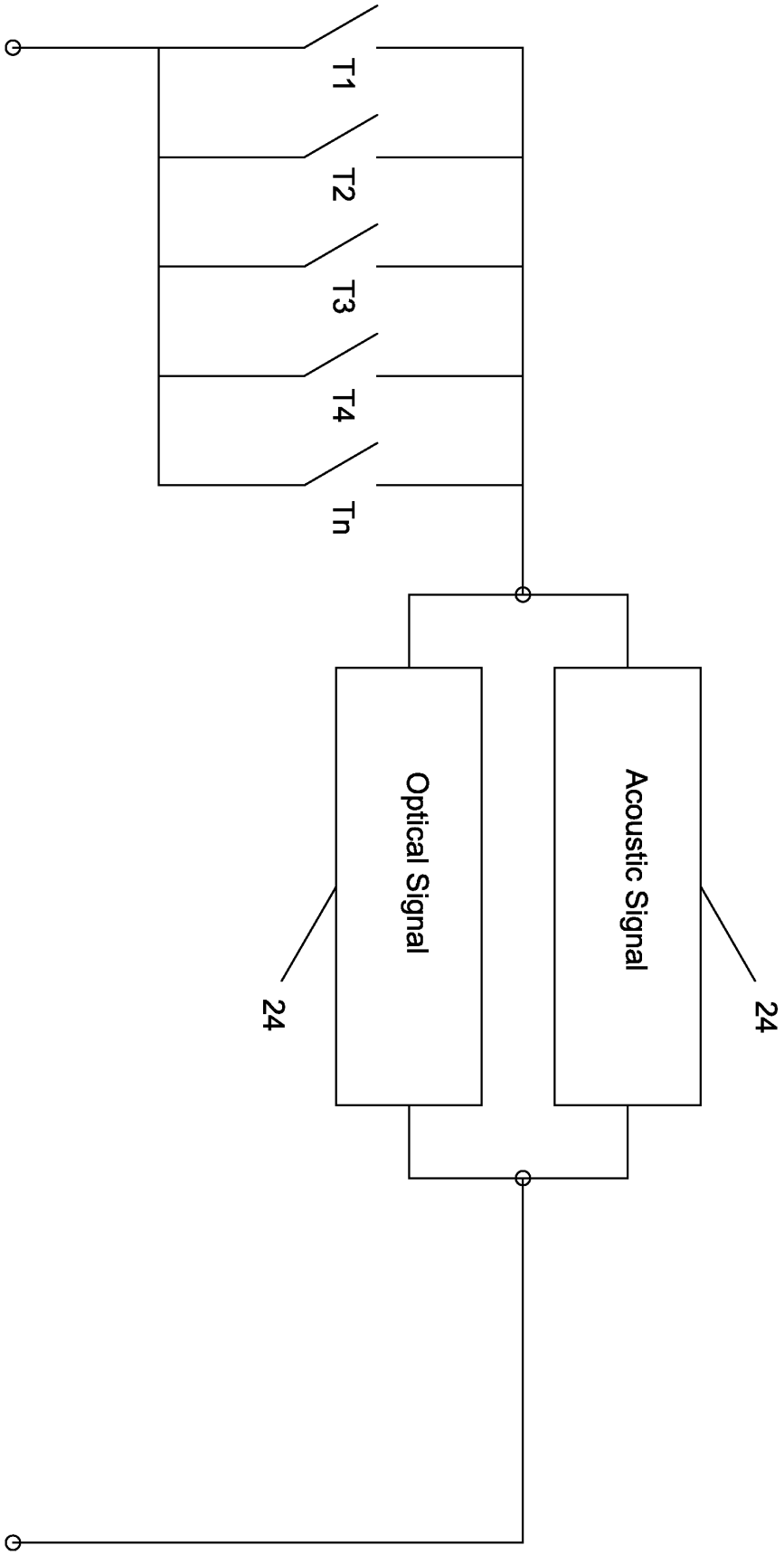

Fig. 2

Simplified electrical installation diagram suitable for detecting anomalous temperatures in a hayloft

T1, T2, T3, T4, Tn, are the switches of the thermostatic sensors